

## Abstract

**The present invention provides a "solid" diamond, i.e. greater than  $5\mu$  thick, electron emitter that has been "machined" using non-contact techniques to a point**

5 **having a radius of less than about  $100\mu$ , preferably below about  $10\mu$  and most preferably between about 3 angstroms and about  $3\mu$ . The solid diamond electron emitters of the present invention can perform, even at these small radii, as multi-point emitters depending upon the radius and roughness of the pointed tip and can be used in arrays to obtain relatively large area field emitters for applications where**

10 **such larger field emissions are necessary. Production of the solid diamond emitters of the present invention is preferably accomplished using non-contact electron or ion beam machining techniques. Residual gas analyzers (RGA) and field emitter extractor gauge analyzers (FERGA) that use the solid diamond emitters are also described.**

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